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AUTHOR Jester, R. Emile
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ABSTRACT

Although the controversy surrounding beginning reading instruction has often centered on the age at which it should be begun, i.e., at the ages of 5, 6, or 7, the position was taken in this study that by the time the child reaches these ages, it is too late for optimum development of reading readiness. As a part of a larger study, groups of infants were provided varying amounts of systematic intellectual stimulation. An attempt was made during all of the stimulation materials to increase the adult's use of language in the presence of the child. When the children reached 3 years of age, they were administered the Stanford Binet Intelligence Test. Factor analysis revealed the following three relatively clear and independent factors: language, memory, and perceptual-motor variables. Significant differences in scores were noted as a function of time and continuity in the stimulation program for the language and memory factors but not for the perceptual-motor variables. It was concluded (1) that intervention with systematic intellectual stimulation curriculum materials does make a difference in performance scores of children and (2) that the time to begin instruction in beginning reading skills is on the baby's day of birth. Tables and references are included. (Author/DH)

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INTELLECTUAL STIMULATION OF THE PRESCHOOLER

or

READING READINESS BEGINS AT BIRTH[1,2]

R. Emile Jester

University of Florida

In 1955 Rudolf Flesch published his Why Johnny Can't Read. The popular success of the book attests to the fact that many persons were somehow disenchanted with existing reading programs at that time. A result of this reaction was that proponents of various reading programs came forward with great vigor proclaiming the advantages of their various programs. Eleven years later in 1967 Jeanne Chall published The Great Debate which is no doubt familiar to everyone who works closely with beginning reading instruction. The debate may still rage on--I don't know--but it does seem clear that reading teachers are still trying to teach children to read and regardless of the method they use that they recognize that the children arriving for instruction are not all alike. The children differ not only in height, weight, and sex, but in their ability to accept beginning reading instruction. Most instructors call this variable "reading readiness." A few choose to ignore the variable and simply begin at the beginning.

Chall (1967) interviewed 25 proponents of various approaches to beginning reading. She concluded that the points of view on

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[2]An earlier version of this article was presented at the Lehigh University Reading Conference, March 27, 1971.

readiness were related to the degree of complexity in each proponent's definition of beginning reading (p. 159). The definitions can be generally classified as either "global" or "specific." Those proponents accepting the global view tended to define "readiness" in such terms as "language ability, experience, general intelligence, interest, and emotional and social development (p. 350)." The global readiness programs emphasize many factors such as picture reading, listening and discussing but seldom provide any practice in letter or word discrimination. Proponents accepting the specific view tended to suggest that the child learn letter recognition and be able to recognize letters by name or sound prior to beginning instruction. The debate about the best age for beginning reading instruction will probably continue so long as the age range is limited to the child's entry into the public school system. It is interesting that so little is said about the child and what can be done prior to his entering the public school system. Chall (1967) did mention the possibility of early learning and mentioned the now well known review of early learning by Fowler (1962) and a study by Durkin (1964) who believed that reading could and should be taught earlier than was then conventional. There was still, however, no mention of pre-readiness variables other than the statement that "perhaps the crucial point is not that children must know <u>all</u> the letters <u>before</u> they learn to read words, but instead that they should <u>pay attention</u> to the letters, and naming or sounding them helps them

pay attention (p. 158)." This statement refers to training in the school program and thus may still be considered to involve a part of formal education. Harris (1961) listed and discussed global characteristics of reading readiness only in terms of such formal school programs. Engelmann (1969) has chosen to ignore the concept of "readiness" but rather to focus on beginning at the child's point of entry into the system and then teaching him to read. In fact, he feels that the child need not even know in advance that he "should pay attention," but that it is the teacher's job to present the material in such a way that the child <u>will</u> pay attention. Engelmann, again, discusses only the role of the teacher and the child's entry into some kind of formal school.

My position is that when a child arrives at school he can, and probably should, be "ready to read" and that this kind of "readiness" is a function of the child's having been taught. I do not accept the notion that if we wait for a child to mature and simply provide a rich environment, he will be ready or teachable. The time for beginning this teaching is at birth. To wait until the child is four or five or six before teaching him reading readiness skills and attitudes is to deny him an advantage in learning one of the most important skills for survival and success in today's world.

During the past 10 years there have been numerous early stimulation and infant stimulation programs. There have, however, been few which have developed a systematic curriculum meant to be deliv-

ered by mothers in the home. One of the most outstanding programs in the United States was initiated by Gordon in 1966 with the express purpose of educating mothers in interacting with and teaching their children specific skills from a series of exercises. The exercises were developed for infants aged three months to two years with the basic orientation representing an extension of the developmental theory of Piaget (Gordon, 1967). The rationale was that infants could be taught to interact with their environment and therefore the materials were arranged so that each task was presented before it should appear according to the norms of Bayley, Gesell, and Cattel. "For instance, according to Cattel the average baby can grasp a string at seven months, so a string was introduced and the baby encouraged to grasp it before the seven months series (Gordon, 1967, p. 24)." In addition to the specific instructions given for each exercise, general instructions were given to call the baby by name and to describe objects around him. Since the mothers involved in this study were from disadvantaged or poverty homes, it was felt that a part of the stimulation exercises should involve increasing their use of language when with their babies. The assumption was that this would, in turn, have a positive effect on the babies' language development and upon his subsequent performance in language usage (see also, Gordon, 1970).

The stimulation materials were eventually extended for children up to three years of age. The latter exercises were built on the same basic rationale but were, of course, more advanced and

an attempt was always made to maintain age appropriateness. As the children approached three years of age the materials included more language and vocabulary variables as well as more insistence that the adult maintain high levels of language usage when in the presence of the child. The children during this third year were able to do many of the kinds of activities that would be expected in preschool programs for four and five year olds and so exercises were designed around activities such as shape recognition, coloring, cutting and pasting, and other forms of perceptual motor activities.

The Stanford Binet Intelligence Test was administered to children who had participated in the program as they reached 36 months of age. Although the Binet provides a unitary IQ score, we were more interested in specific factors or variables measured by the test. The Stanford Binet was factor analyzed in an attempt to differentiate clusters of items which could be identified with the children's later success. As a result of the factor anlaysis three factors were named Language, Memory, and Perceptual-Motor skills. A list of the Stanford Binet items with the factors is presented in Table 1. It is clear from an examination of the table

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Insert Table 1 about here

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that the factors are relatively free of overlap.

The means and standard deviations for the language factor

scores are presented in Table 2 and are organized according to length of time or amount of participation in the infant stimula-

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Insert Table 2 about here

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tion project. The longest time that any youngster participated in the project was three full years. It is obvious from an examination of the table that these children scored higher on the language factor than any of the other groups. The difference is statistically reliable at the .05 level. Although there isn't a great deal of difference between 2.81 items and 3.30 items, in terms of practical application, it is apparent that these scores are higher for the three year group than for the other groups and further, if the itmes in the Binet from which the score derives are examined, it can be seen that most of the items appear in the Binet at the three year and six month level. The children who were in the program for three full years seem to have performed better practically as well as statistically than children who spent less time in the stimulation program.

Factor II, Memory, consists of five items from the Stanford Binet. As can be seen from Table 1, these items range from 2 years-6 months to 4 years. Again, children who had been in the program longer scored higher than the other children (see Table 2). The most striking difference appears between the children who were in the program from three full years and the children who had no ex-

perience with the stimulation program. It seems, as it did with the language factor, that the performance level is sequential depending upon the number of years of participation.

Factor III, which we have labeled Perceptual-Motor, consists of six items from the Stanford Binet. An examination of Table 1 will reveal which items these are. The items seemed to cluster at a slightly lower level than did the other factor items. The range was from three years to three and a half years. The means for the four groups clustered around three and are not reliably different from each other (see Table 2).

As an integral part of the experimental design from which these data were derived, groups of children started and ended stimulation at varying times during the three year interval of the project. This breakdown sheds additional light upon the point at which stimulation seems to have its greatest effect. These data are presented in Table 3. For Factor I, Language, it is clear that the group which had the longest continuous time with stimulation scored highest on the seven items contributing to this factor score. It is interesting that for the Language factor the stimulation occurring during the third year seems to have had the most dramatic effect. This is evidenced by the fact that groups 1, 3, 4, and 7 produced the highest mean score while groups 5 and 6 were comparable to the control group and group 2, which had been stimulated for two years, was somewhere in between these extremes. It seems that not only is it wise to begin stimulation early, but it is important that the stimulation not be stopped once started. It also appears that one year of stimulation at one or two years

of age is probably not going to change the child appreciably from where he would be with no added stimulation at all. In general, the policy might best be that with regard to stimulation and language, the earlier and the more continuous, the better.

Factor II, Memory, shows the same general pattern that it did in the more general analysis. Again, the group which had been stimulated the longest scored significantly higher than groups which had received lesser amounts of stimulation. The exception to this is with group 3, which received stimulation during the last two years of the project. The differences are quite small, however, and may not stand up under repeated observation. In spite of this fluctuation, however, it is very clear that the stimulation had an effect.

The Perceptual-Motor group of items, or Factor III, reveals rather interesting patterns when contrasted with the more gross analysis reported earlier. Children who participated in the program between the ages of one and two out-performed the other children markedly. In fact, an examination of the table will show that this group was the only group to perform better than the control group which received no stimulation during the course of the project. The group next in line is group 7, which participated only during their third year of life. It is not clear why these groups scored as they did. Since one would expect that group 1, which included the third year, would also have scores as high as the other two groups. Group 4, which participated during their first and third

year of life also adds puzzlement to this situation. One might speculate that the reason the Perceptual-Motor scores are depressed for groups participating longer in the program is due to the fact that mothers are placing more emphasis on language and less on Perceptual-Motor activities. This is a lovely hypothesis but does not stand up since group 3, which had participated in the program for the last two years, scored highest on Perceptual-Motor and was not markedly different on Language and Memory from the highest group. The only groups which were consistently low were 5 and 6. In no case did these groups score higher than any other group. There are a number of reasonable speculations which could be made. For instance, mothers of children in the first year stimulation program could have continued stimulating their children with materials below their level. This might retard the child more than if left to his own resources as with the control group. The mothers of children who participated only during the second year might have started with too little prerequisite instruction of the child so that what they were doing was incomprehensible to the youngster and produced little learning. Two years of such stimulation would not make much difference. It is relatively easy post hoc to arrive at neat and tidy explanations for what happened that we didn't expect, but future research taking these variables into account is needed for a definitive answer.

The conclusion to be drawn is that intervention with systematic intellectual stimulation curriculum materials does make a difference in performance scores of children. This program goes

somewhat further than the "language experience proponents" cited by Chall (1967, p. 59) who accept the traditional conventional statements related to readiness. The intellectual stimulation materials discussed here provide for systematic entry into the child's life. This systematic entry is to be contrasted with the "natural" occurrence of language in the child's environment. An attempt is made during all of the stimulation materials to increase the adult's use of language in the presence of the child. We have shown that such an increased use of language does indeed increase scores on variables from the Stanford Binet which are similar to variables found in reading readiness programs and measures.

The arguments will probably continue for some time regarding when reading instruction should begin. No matter what data are presented and no matter what rational logic is used to deal with these data, there will probably be someone who comes forward and says, "That is very nice data, but I believe...." You can be sure that his beliefs will not coincide with the data and that he therefore will not accept the data. Although the data reported here do not necessarily mean that I am concluding with a true statement based on them, I would like to offer my opinion and belief. The time to begin instruction in beginning reading skills is not at six years or five years or even at one year. The time to begin instruction in beginning reading skills is on the baby's day of birth.

SUMMARY

There has been controversy surrounding techniques of teaching beginning reading and the age at which to begin teaching readiness skills. Most of the arguments seem to center around the time at which the child traditionally enters the public school system; i.e., at the ages of 5, 6, or 7. The position taken here is that by the time the child reaches these ages, he should be ready to begin reading instruction and that it is too late for optimum development of his reading readiness.

As a part of a larger study begun in 1966, groups of infants were provided varying amounts of systematic intellectual stimulation. When the children reached three years of age they were administered the Stanford Binet intelligence test. This test was then factor analyzed and three relatively clear and independent factors were observed. The first consisted of seven Binet items related to language variables. The second consisted of five Binet items related to memory variables. The third consisted of six Binet Items related to perceptual motor variables.

Factor scores for the three Binet factors were analyzed and statistically reliable differences were noted as a function of time and continuity in the stimulation program for the language and memory factors. The analysis showed no reliable distinction as a result of variability in time and continuity of stimulation for the perceptual motor variables.

The conclusion was drawn that with respect to these variables, which seem to be related to those typically considered in

readiness programs and testing, there is a significant advantage to early and continuous intellectual stimulation.

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TABLE 1

Stanford Binet Factors
Used in Group Comparisons

Factor I Language

S-B Level	Description
II-6	Identifying objects by use
II-6	Picture vocabulary
III-6	Comparison of balls
III-6	Discrimination of animal pictures
III-6	Response to pictures
IV	Pictorial identification
IV	Discrimination of forms

Factor II Memory

S-B Level	Description
II-6	Obeying simple commands
III	Picture memories
III-6	Sorting buttons
IV	Naming objects from memory
IV	Pictorial identification

Factor III Perceptual Motor

S-B Level	Description
III	Stringing beads
III	Block building: bridge
III	Copying a circle
III-6	Comparison of balls
III-6	Patience: pictures
III-6	Sorting buttons

TABLE 2

Means and Standard Deviations for
Three Stanford Binet Factors by
Number of Years of Participation in Stimuation Program

		Factor					
		Language		Memory		Perceptual-Motor	
Years	N	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
3	27	3.30*	1.98	2.26*	1.48	3.00	1.82
2	36	2.81	1.82	2.08	1.48	3.11	1.49
1	76	2.59	1.68	1.68	1.31	3.05	1.52
0	51	2.33	1.81	1.61	1.23	2.98	1.64

* Higher than years 0 and 1. $p < .05$

TABLE 3

Means and Standard Deviations for
Three Standford Binet Factors by Number of Years and
Timing of Participation in Stimulation Program

			Factor					
			Language		Memory		Perceptual-Motor	
Group	Years	N	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
1	1,2,3	27	3.30[a]	1.98	2.26[b]	1.48	3.00[c]	1.82
2	1,2	17	2.64	1.97	2.12	1.69	2.82	1.63
3	2,3	8	3.00	1.85	2.50	1.31	4.12[d]	1.25
4	1, 3	11	2.91	1.70	1.73	1.27	2.82	1.17
5	1	10	2.10	1.60	1.40	1.17	2.30	1.49
6	2	10	2.00	1.41	1.60	1.08	1.90	1.45
7	3	56	2.78	1.73	1.75	1.38	3.39[e]	1.41
8	0	51	2.33	1.81	1.61	1.23	2.98[f]	1.64

a. Higher than groups 5, 6, and 8. $p < .05$
b. Higher than groups 5 and 8. $p < .05$
c. Higher than group 6. $p < .05$
d. Higher than groups 1, 2, 4, 5, 6, and 8. $p < .05$
e. Higher than groups 5 and 6. $p < .05$
f. Higher than group 6. $p < .05$